Trend Study 14-18-99

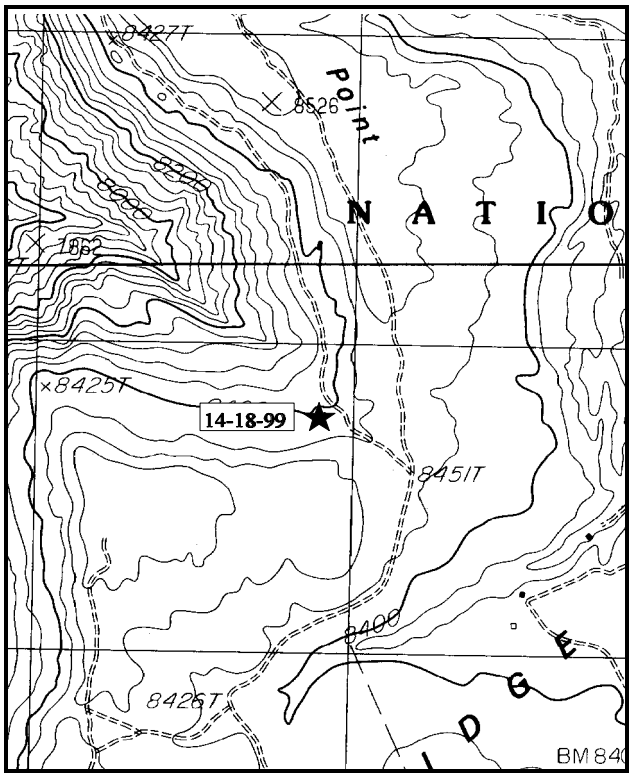
Study site name: Kigalia Point . Range type: Selective Logged-Ponderosa Pine.

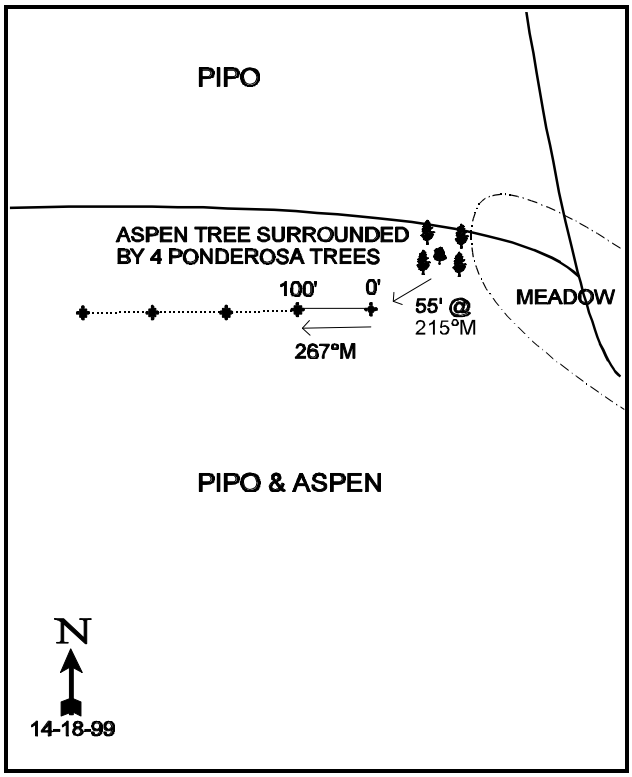
Compass bearing: frequency baseline 252°M.

Footmark (first frame at) 5 feet, footmarks (frequency belts) line 1 (11& 71ft), line 2 (34ft), line 3 (59ft), line 4 (95ft).

LOCATION DESCRIPTION

From the turnoff to the Kigalia Guard Station on the main Elk Ridge-Bears Ears Road, proceed southwest for 0.50 miles to the Kigalia Point Road. Turn right on this road and travel north for 1.35 miles to a small clearing in the ponderosa pine-aspen forest with a faint road turning off to the left. Turn left onto this road and travel 0.05 miles (just past the west end of the clearing) to where four clustered ponderosa with a large aspen growing in the middle of them are located on the left side of the road. Stop here and walk 55 feet southwest from these trees to a red painted fence post, 22 inches high. The baseline samples the same area as line 1 of the 1981 line intercept transect.





Map Name: Kigalia Point Diagrammatic Sketch

Township 36S , Range 19E , Section 4 UTM 4170639.834 N, 603105.120 E

DISCUSSION

Trend Study No. 14-18 (36-6)

Kigalia Point is a narrow, two mile long ridge on the north side of south Elk Ridge. The point drops sharply on all sides to the east, west and north. Elevation is consistently around 8,400 feet on top. The level terrain on top of this extension of the plateau is dominated by Ponderosa pine and quaking aspen with a dense understory. In the early 1960's, part of this area was logged to harvest old growth timber as part of an accelerated harvest to minimize beetle damage. In 1964, a small part of the section was thinned. The Forest Service has planned for a shelter-wood cut in approximately 15 to 20 years from site establishment in 1986.

Another major use of this area is cattle grazing. As part of the Kigalia Peavine unit on the Twin Springs allotment, the area is grazed on a three pasture rest-rotation system with a June 1 to October 1 season of use. The stocking rate is 500 head of cattle (2,640 AUMs) with no planned increase. In 1992, cattle were grazing the allotment and use was moderate, with grass utilization at about 50%. The area sometimes receives heavy summer deer use. Numerous deer, especially does and fawns, were observed along the transect during past readings. Resting cover is good, but the openness of the forest above 3 to 4 feet does not hide a moving animal. There was some elk use near the edges of the ridge, where old elk sign was found on the transect in 1986. Bear sign was also noted that same year. Pellet group data taken on the site in 1999, estimate 5 deer days use/acre (12 ddu/ha), 13 elk (32 edu/ha), and 5 cow days use/acre (12 cdu/ha). Over 20 elk, cows and calves, were seen on the site during the 1999 reading. There were also several deer seen in the area. Other uses of the forest include mining claims, uranium exploration, and recreation. The area has an extensive network of roads allowing easy access to most of the remote areas.

Typical of high elevation conifer-aspen sites with dense understory vegetation, the soil is rarely exposed and has a well developed layer of litter and organic matter. The mineral soil is moderately deep with an estimated effective rooting depth of nearly 21 inches. It has a loam texture with a moderately acid pH (6.0). Phosphorus is low at 5.1ppm. Levels less than 10 ppm are limiting to normal plant growth and development. Due to the thick herbaceous cover, abundant litter, and level terrain, erosion is not a problem unless the soil is significantly disturbed by such activities as logging and road building.

The frequency baselines, established in 1986, were set up on the old Interagency line intercept study base line. The site is basically level, with a slight northern aspect. Evidence of logging activity is indicated by numerous stumps and downed trees and limbs.

The Ponderosa pine and quaking aspen over story shade most of the study site. Density estimates for Ponderosa pine and aspen were estimated at 66 and 466 trees/acre respectively in 1986. A majority of the aspens were tall enough that no leaves or twigs were available for browsing. These estimates have changed somewhat due to the much increased sample size which gives a more accurate estimate. Point quarter data from 1999, estimate 134 aspen and 50 ponderosa trees/acre. Average diameter of aspen is estimated at 10.3 inches and Ponderosa at 14 inches.

Oak varies from stands of mature and unavailable plants to clumps of young and moderately browsed sprouts. The scattered dense clumps were made up mainly of young plants, most sprouting vigorously, although some insect damage was evident in 1986. The most abundant shrub is mountain snowberry with an estimated density of 19,200 plants/acre in 1986 and 23,880 in 1994. Fifty-seven percent of the snowberry encountered in 1986 were classified as young sprouts, increasing to 63% in 1992. The young, along with the 2 ½ foot tall mature plants, were vigorous and generally only moderately browsed. Ten percent of the snowberry was heavily browsed in 1992 and almost 10% of the plants were also considered in poor vigor. Density of snowberry declined to 6,460 plants/acre in 1999 due to a controlled ground fire which occurred sometime during the fall of 1998. The surviving plants are lightly browsed and in good vigor.

The herbaceous understory forms a dense layer under the aspen and snowberry. It is vigorous and diverse, composed of many different perennial grasses and forbs. Fourteen species of grass were sampled on the frequency belts in 1992. The most abundant was Kentucky bluegrass, which is considered an increaser with heavy grazing. Other prevalent species were smooth brome, timothy, and intermediate wheatgrass. No utilization of the grasses was apparent. Some of the forbs show signs of use. The more common and preferred species were Kings clover, dandelion, trailing fleabane, and fewflower peavine. Use is light and all species appear vigorous.

1986 TREND ASSESSMENT

The lack of significant changes in plant composition and density found by rereading the line intercept transects, plus data from the Interagency study and on-site observations indicate a stable vegetative trend. The possible increases in snowberry and oak density and production are positive changes, as they are the only plants observed to show consistent signs of use. Aspen production is largely unavailable for use. Forbs are abundant and constitute an important part of this summer range. Long term trends indicate a gradual increase in the number and production of woody species, including ponderosa pine, which will eventually cause only minor decreases in the understory herbaceous species because of the structure of ponderosa. Trend will probably remain stable until the area is impacted by future logging operations. The soil is fertile and well protected and also will remain stable until disturbed.

1992 TREND ASSESSMENT

The soil trend is considered stable because percent bare ground is still below 10%. The browse trend for this range is not as critical for it is a summer range. Both Gambel oak and aspen have decreased densities, but this is more reflective of a much larger sampling design than any actual decreases in density. Wood's rose and serviceberry have increased estimated densities, but are still in low numbers. Trend for browse should be considered stable, although it is not critical for this summer range. There are 14 species of grasses which have increased nested frequency values and 18 forb species, which have nested frequency values that have decreased slightly since 1986. The increasing grass component makes up 79% of the herbaceous understory cover. The herbaceous understory is vigorous and productive with a stable to slightly improving trend. The improvements are due mostly to the grasses.

TREND ASSESSMENT
soil - stable
browse - stable, but not critical for this summer range
herbaceous understory - stable to slightly up

1999 TREND ASSESSMENT

A prescribed ground fire burned the area sometime during the fall of 1998. The disturbance significantly changed the ground cover characteristics as well as the browse densities. Many ponderosa pine trees are scorched up to a height of 30 to 40 feet but otherwise unharmed by the fire. Ground cover is still abundant but litter cover did decline from 83% to 69% and percent bare ground increased from 4% to 13%. Erosion is not a problem however. Trend is considered slightly down however, due to the reduction in protective cover. Trend for browse is down due to a decline in density of all shrub species. However, shrubs are not as important on a summer range as the herbaceous understory. The fire did stimulate sprouting of aspen and snowberry which will increase in the future. Trend for the herbaceous understory is down slightly due to a decline in the sum of nested frequency of perennial grasses. Currently only smooth brome and Kentucky bluegrass are abundant. These species provide 43% and 39% of the grass cover respectively. Frequency of perennial forbs remained stable. This is likely only a temporary setback due to the burn. With the reduction of shrubs on the site, grasses and forbs will recover in the future.

TREND ASSESSMENT
soil - down slightly, due to fire
browse - down due to the effect of fire
herbaceous understory - down slightly

HERBACEOUS TRENDS --
Herd unit 14 , Study no: 18

Type	Species	Nested Frequency '86	'92	'99	Quadrat Frequency '86	'92	'99	Average Cover % '92	'99
G	Agropyron intermedium	a14	b77	51	5	29	18	1.82	1.68
G	Agropyron trachycaulum	a20	b32	a11	7	12	5	1.02	.05
G	Bromus anomalus	a-	b21	b18	-	10	7	.77	.28
G	Bromus inermis	a85	b179	b187	34	60	59	11.11	7.80
G	Carex spp.	b13	b5	a-	5	3	-	.04	-
G	Dactylis glomerata	a16	b39	ab19	6	16	8	1.67	.75
G	Festuca thurberi	-	6	-	-	2	-	.53	-
G	Juncus spp.	a-	b7	a-	-	4	-	.04	-
G	Oryzopsis hymenoides	3	-	-	1	-	-	-	-
G	Phleum alpinum	-	-	3	-	-	1	-	.03
G	Phleum pratense	40	36	23	21	14	10	1.06	.34
G	Poa pratensis	b294	a216	a203	87	67	62	16.39	7.03
G	Sitanion hystrix	b30	ab24	a3	17	9	2	1.31	.06
G	Stipa columbiana	a-	b29	a-	-	11	-	.35	-
G	Stipa comata	a-	b5	a-	-	3	-	.41	-
Total for Annual Grasses		0	0	0	0	0	0	0	0
Total for Perennial Grasses		515	676	518	183	240	172	36.56	18.05
Total for Grasses		515	676	518	183	240	172	36.56	18.05
F	Achillea millefolium	c164	b94	a59	68	35	24	3.83	1.34
F	Agoseris glauca	-	-	1	-	-	1	-	.03
F	Antennaria spp.	-	2	-	-	1	-	.00	-
F	Arenaria congesta	-	3	-	-	1	-	.03	-
F	Collomia linearis (a)	-	3	13	-	1	5	.03	.05
F	Comandra pallida	-	-	6	-	-	2	-	.01
F	Erigeron flagellaris	19	40	19	8	16	9	2.42	.11
F	Erigeron speciosus	1	4	-	1	2	-	.06	-
F	Geranium spp.	-	1	4	-	1	2	.03	.06
F	Lathyrus lanszwertii	a8	b65	b78	3	30	27	1.16	4.01
F	Lomatium spp.	-	8	6	-	4	2	.04	.15
F	Polygonum douglasii (a)	-	b21	a2	-	10	1	.07	.00
F	Senecio canus	ab2	b7	a-	1	3	-	.01	-

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'86	'92	'99	'86	'92	'99	'92	'99
F	Stellaria jamesiana	$_{a}$-	$_{b}$24	$_{b}$38	-	10	15	.17	.61
F	Taraxacum officinale	$_{b}$126	$_{ab}$113	$_{a}$86	50	50	37	.89	1.66
F	Thlaspi fendleri	-	1	-	-	1	-	.03	-
F	Thermopsis montana	$_{ab}$43	$_{a}$17	$_{b}$50	16	7	17	.26	2.84
F	Trifolium kingii	$_{b}$183	$_{a}$74	$_{a}$104	77	29	39	.44	3.07
F	Unknown forb-perennial	$_{b}$9	$_{ab}$1	$_{a}$-	5	1	-	.00	-
F	Vicia exigua	$_{b}$16	$_{a}$-	$_{a}$-	8	-	-	-	-
F	Viola spp.	-	2	-	-	1	-	.00	-
Total for Annual Forbs		0	24	15	0	11	6	0.10	0.05
Total for Perennial Forbs		571	456	451	237	192	175	9.41	13.93
Total for Forbs		571	480	466	237	203	181	9.51	13.98

Values with different subscript letters are significantly different at % = 0.10

BROWSE TRENDS --
Herd unit 14 , Study no: 18

Type	Species	Strip Frequency		Average Cover %	
		'92	'99	'92	'99
B	Amelanchier alnifolia	1	0	-	-
B	Pinus ponderosa	8	6	17.36	.38
B	Populus tremuloides	5	7	7.45	.48
B	Quercus gambelii	19	6	5.21	.36
B	Rosa woodsii	22	12	.36	.10
B	Symphoricarpos oreophilus	91	76	22.51	6.27
Total for Browse		146	107	52.91	7.59

CANOPY COVER --
Herd unit 14 , Study no: 18

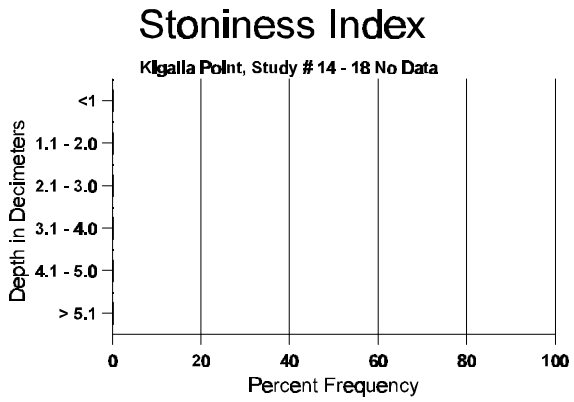
Species	Percent Cover '99
Pinus ponderosa	22
Populus tremuloides	9

BASIC COVER --
Herd unit 14 , Study no: 18

Cover Type	Nested Frequency '92	Nested Frequency '99	Average Cover % '86	Average Cover % '92	Average Cover % '99
Vegetation	345	336	13.25	74.02	44.20
Rock	-	2	0	.01	.38
Pavement	-	-	0	0	0
Litter	230	394	83.00	83.83	69.15
Cryptogams	4	-	0	.00	0
Bare Ground	51	175	3.75	3.93	12.71

SOIL ANALYSIS DATA --
Herd Unit 14, Study # 18, Study Name: Kigalia Point

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%0M	PPM P	PPM K	dS/m
20.8	54.5 (17.9)	6.0	46.0	36.2	17.8	3.6	5.1	99.2	0.4



PELLET GROUP DATA --
Herd unit 14 , Study no: 18

Type	Quadrat Frequency '92	Quadrat Frequency '99	Pellet Transect Days Use/Acre (ha) '99
Rabbit	3	-	N/A
Elk	5	5	13 (32)
Deer	16	-	5 (12)
Cattle	9	-	5 (12)

BROWSE CHARACTERISTICS --
Herd unit 14 , Study no: 18

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Amelanchier alnifolia																		
Y	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	92	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
D	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	92	-	1	-	-	-	-	-	-	-	-	-	-	1	20			1
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'86	00%	00%	00%	
'92	50%	00%	50%	
'99	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'86	0	Dec:	0%
	'92	40		50%
	'99	0		0%

Pinus ponderosa																		
Y	86	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	92	-	-	-	-	-	-	1	-	-	1	-	-	-	20			1
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	92	3	-	-	-	-	-	-	6	-	9	-	-	-	180	-	-	9
	99	3	-	-	-	-	-	-	6	-	9	-	-	-	180	-	-	9
D	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	92	-	-	-	-	-	-	-	1	-	1	-	-	-	20			1
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'86	00%	00%	00%	+70%
'92	00%	00%	00%	-18%
'99	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'86	66	Dec:	0%
	'92	220		9%
	'99	180		0%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Populus tremuloides																		
S	86	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	92	1	1	-	2	-	-	-	-	-	3	1	-	-	80			4
	99	9	-	-	-	-	-	-	-	-	9	-	-	-	180			9
Y	86	-	-	-	-	-	-	-	2	-	2	-	-	-	133			2
	92	-	-	-	-	-	-	-	1	-	1	-	-	-	20			1
	99	10	-	-	-	-	-	-	-	-	10	-	-	-	200			10
M	86	-	-	-	-	-	-	-	5	-	5	-	-	-	333	303	61	5
	92	-	-	-	-	-	-	-	4	-	4	-	-	-	80	-	-	4
	99	-	-	-	-	-	-	-	3	-	3	-	-	-	60	-	-	3
D	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	92	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	1	-	-	-	-	-	-	1	-	2	-	-	-	40			2
X	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	92	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	20			1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'86	00%	00%	00%	-79%
'92	00%	00%	00%	+67%
'99	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
'86	466	Dec:		0%
'92	100			0%
'99	300			13%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Quercus gambelii																		
S	86	20	2	3	-	-	-	-	-	-	20	4	1	-	1666			25
	92	28	1	-	1	-	-	3	-	-	33	-	-	-	660			33
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	86	26	10	7	-	-	-	-	-	-	36	6	1	-	2866			43
	92	27	67	2	4	1	-	-	-	-	80	21	-	-	2020			101
	99	17	-	-	-	-	-	-	-	-	17	-	-	-	340			17
M	86	1	-	-	-	-	-	-	2	-	3	-	-	-	200	143	39	3
	92	-	2	4	-	-	-	-	6	-	12	-	-	-	240	-	-	12
	99	-	-	-	-	1	-	-	1	-	2	-	-	-	40	171	59	2
D	86	1	1	9	-	-	1	1	-	-	5	1	6	1	866			13
	92	-	2	1	-	-	-	-	-	-	2	-	-	1	60			3
	99	-	-	-	-	-	-	2	1	-	1	-	-	2	60			3
X	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	92	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	200			10

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'86	19%	29%	14%	-41%
'92	62%	06%	.86%	-81%
'99	05%	00%	09%	

Total Plants/Acre (excluding Dead & Seedlings)				
'86	3932	Dec:		22%
'92	2320			3%
'99	440			14%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Rosa woodsii																		
S	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	92	11	-	-	8	-	-	-	-	-	19	-	-	-	380			19
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
Y	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	92	34	4	-	26	-	-	-	-	-	64	-	-	-	1280			64
	99	23	-	-	-	-	-	-	-	-	23	-	-	-	460			23
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	92	-	2	-	-	-	-	-	-	-	2	-	-	-	40	-	-	2
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
D	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	92	1	-	3	-	-	-	-	-	-	3	-	-	1	80			4
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
X	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	92	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	40			2

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'86	00%	00%	00%	
'92	09%	04%	01%	-67%
'99	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'86	0	Dec:	0%
	'92	1400		6%
	'99	460		0%

Symphoricarpos oreophilus																		
S	86	125	1	-	-	-	-	-	-	-	126	-	-	-	8400			126
	92	74	1	-	63	-	-	52	-	-	190	-	-	-	3800			190
	99	32	-	-	-	-	-	-	-	-	32	-	-	-	640			32
Y	86	103	53	9	-	-	-	-	-	-	164	-	-	1	11000			165
	92	456	218	42	32	-	-	-	-	-	635	-	-	113	14960			748
	99	207	22	-	-	-	-	-	-	-	229	-	-	-	4580			229
M	86	33	71	10	-	-	-	-	-	-	114	-	-	-	7600	28	20	114
	92	77	280	77	11	-	-	-	-	-	445	-	-	-	8900	-	-	445
	99	44	9	-	-	-	-	-	-	-	53	-	-	-	1060	18	24	53
D	86	2	5	2	-	-	-	-	-	-	8	-	1	-	600			9
	92	-	1	-	-	-	-	-	-	-	1	-	-	-	20			1
	99	37	4	-	-	-	-	-	-	-	39	-	-	2	820			41
X	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	92	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	920			46

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'86	45%	07%	.69%	+20%
'92	42%	10%	09%	-73%
'99	11%	00%	.61%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'86	19200	Dec:	3%
	'92	23880		0%
	'99	6460		13%